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PHOSPHORIC ACID.[1]

By Prof. Virgil Coblentz and Otto B. May, Ph.D.

A criticism has been made that the percentage strength of phosphoric acid, determined by the present alkalimetric titration, does not give results in accordance with those obtained from the specific gravity and its table (page 661, U.S.P.). Experiments having confirmed this criticism, it was decided to investigate our official method, in addition to others, which might be available for pharmacopœial purposes. It was also noted that, with different dilutions, the percentage strength indicated by the specific gravity did not always coincide with the gravimetric determinations. These will be investigated later. For the following experiments, a sample of phosphoric acid fulfilling the U S.P. tests for purity was assayed gravimetrically. This contained 84·84 per cent. of absolute phosphoric acid. From this acid, 10 and 5 per cent. dilutions were prepared and the results calculated to that of the original acid employed. The 10 or 5 c.c. employed for each titration was carefully measured from a burette and titrated with normal potassium hydroxide, V. S., using phenolphthalein as indicator.

[1] This, with such other similar publications as may appear in the columns of the Journal of Pharmacy, represent research work carried out by Dr. Otto May, under the direction of V. Coblentz, chairman of the Sub-committee on Inorganic Chemicals of the Committee of Revision of the U.S. Pharmacopœia.

		Normal Potassium Hydroxide, V. S. (N/1 KOH, V. S.)		Absolute Phosphoric Acid (H_3PO_4) Per Cent.
1.	10 c.c. acid without diluting with water	16·3 c.c.	corresponding to	81·72
2.	10 " " " " "	16·9 "	"	82·21
3.	10 " " + 10 c.c. sat. sol. NaCl	18·1 "	"	88·05
4.	10 " " + 10 " " " "	18·1 "	"	88·05
5.	10 " " + 10 " " " "	18·2 "	"	88 53
6.	10 " " + 10 " " " " + 90 c.c. H_2O.	18·3 "	"	89·04
7.	10 " " + 10 " " " " " " " .	18·35 "	"	89·25
8.	10 " " + 10 " " " " " " " .	18·35 "	"	89·25
9.	10 " " + excess, dry NaCl	20·6 "	"	100·20
10.	10 " " + " " " + 100 c.c. H_2O .	20·2 "	"	98·33
11.	10 " " + 10 c.c. sat. sol. NH_4Cl	19·2 "	"	93 40
12.	10 " " + 10 " " " "	19·3 "	"	93 88
13.	10 " " + 20 " " " "	20 2 "	"	98 26
14.	10 " " + 20 " " " "	20·2 "	"	98·26
15.	10 " " + 20 " " " " + 80 c.c. H_2O .	22·6 "	"	109·9

When the acid is titrated without dilution, the end-reaction is not sharp, phenolphthalein giving a rose tint when two thirds of the acid has been neutralized, thus:

$$H_3PO_4 + 2KOH = K_2HPO_4 + 2H_2O.$$

This irregularity in the alkalimetric estimation of phosphoric acid is brought about through the variable valency of the H atoms of the acid, influenced by its dissociation. Although H_3PO_4 possesses three replaceable hydrogen atoms, yet it is only a feeble acid, that is, there are but few H ions present in its dilutions. As shown by its relative conductivity, only H and H_2PO_4 ions are present in any quantity. In the alkalimetric titrations the kations HPO_4 and PO_4 have the tendency to go over into the stabler H_2PO_4 ion, according to the equations:

$$Na_3 — PO_4 + H — OH = Na_2 — HPO_4 + Na — OH.$$
$$Na_2 — HPO_4 + H — OH = Na — H_2PO_4 + Na — OH.$$

Since NaOH dissociates completely, free OH kations are present in its solution. The color change of the indicator is dependent on the degree of concentration of the dissociated —OH ions, which in turn is governed by the extent of dilution and the presence of an ionizable salt. This explains the irregularities among the results of experiments 3 to 15, inclusive.

The differences between the lower gravimetric results (84 84 per cent.) and those of experiments 3, 4, 5, etc. (88 to 89 25) might be explained, according to the preceding ionic theory, by the conversion of eleven-twelfths of the acid into Na_2HPO_4 and one-twelfth

into Na_3PO_4. Again, as in experiment 9, a mixture of 32 per cent. of K_3PO_4 and 78 per cent. of K_2HPO_4 will have required 20·6 c.c. of N/1 KOH, V.S. for the neutralization of the acid used. The results of these titrations, while corresponding quite satisfactorily when carried out under the same conditions, are invariably high and fluctuating, through variations in dilution and ionizable salts. A few titrations, with methyl orange as indicator, are added:

		N/1 KOH, V.S.	H_3PO_4. Per Cent.
10 c.c. H_3PO_4 (10 per cent.)	+ 10 c.c. sat. sol. NaCl	8.9 c.c. KOH	corresponding to 86·59
10 " "	" 10 " " " "	9·05 " "	" 88·05
10 " "	" 10 " " " "	9·05 " "	" 88·05
10 " "	" 10 " " " "	9·05 " "	" 88·05

Among other methods possibly available for pharmacopœial purposes, the following iodometric one, proposed by A. Christensen (*Jahresberichte d. Phar.*, 96, 338) has been found to be very satisfactory. The method is simple and gives uniform results, agreeing accurately with gravimetric determinations. This method is based on the reaction taking place between phosphoric acid, potassium iodide and bromate in solution, whereby a molecular equivalent quantity of iodine is liberated for each molecule of phosphoric acid present. Thus:

$$6H_3PO_4 + 6KI + KBrO_3 = 6KH_2PO_4 + 3I_2 + KBr + 3H_2O$$

$$6 \times 97{\cdot}29 \text{ p. } H_3PO_4 = 6 \times 125{\cdot}9 \text{ p. I} = 6 \times 246{\cdot}46 \text{ p. } Na_2S_2O_3, \text{ or}$$

$$97{\cdot}29 \text{ p. } H_3PO_4 = 125{\cdot}9 \text{ p. I} = 246{\cdot}46 \text{ p. } Na_2S_2O_3, \text{ or}$$

$$1\text{cc.N}/10\ Na_2S_2O_3, \text{V.S. } (0{\cdot}024646 \text{ gm.}) = 0{\cdot}009729 \text{ gm. } H_3PO_4.$$

A 5 per cent. solution of the original sample of phosphoric acid was employed in these estimations and the results calculated to the strong acid, for comparison. Like all iodometric methods of this class, the operation is carried out in a securely stoppered bottle. In an accurately fitted glass-stoppered bottle of about 150 c.c. capacity, 5 c.c. of the sample of phosphoric acid (measured from a burette) was introduced, followed by approximately 2 grammes of potassium iodide, 5 c.c. of a saturated solution of potassium bromate and 30 c.c. of water. After securing the stopper, the bottle and contents were nearly immersed in a bath of water at the temperature of 65° C. for ten minutes; after cooling thoroughly, removing (rinsing the neck and stopper), the liberated iodine was estimated as usual with sodium thiosulphate, V. S.

H_3PO_4	Sodium Thiosulphate, V. S.	H_3PO_4 abs. in Original Sample.
5 c.c.	21·9	85·24 per cent.
5 "	21·8	85·84 " "
5 "	21·7	84·44 " "
5 "	21·8	84·84 " "
5 "	21·9	84·24 " "
5 "	21·8	84·84 " "

Exposure to temperatures above 65° C. entail a loss in iodine through failure of (even specially constructed) pressure vials to seal securely. Digestion for longer periods, at lower temperatures, cause a further liberation of iodine due to secondary reaction. Experiments were then made to determine the feasibility of a cold method whereby the objectionable features of the above might be avoided. It was found that the reaction (according to theory), is complete after a period of 2·5 to 3 hours, when the securely stoppered flask and contents are exposed to a room temperature of 20° C. These conditions must be strictly followed, otherwise low or high results will be obtained.

H_3PO_4	Sodium Thiosulphate, V. S.	H_3PO_4 abs. in Original Sample.
5 c.c., 3 hours	28·7 c.c.	84·44 per cent.
5 " 3 "	21·8 "	84·84 " "
5 " 3 "	21·8 "	84·84 " "
5 " 2½ "	21·8 "	84·84 " "
5 " 2½ "	21·85 "	85·00 " "

The gravimetric estimation of abs. H_3PO_4 in the original sample being 84·84 per cent., further comparisons are unnecessary to demonstrate the value of this method for the accurate titrimetric estimation of phosphoric acid.

OIL OF BITTER ALMONDS.

By Frank O. Taylor.

It is well known that the oil of bitter almonds of commerce is largely substituted by artificial benzaldehyde, and even that which is natural is not often derived from the almond, but from the kernel of the apricot; but the extent of this substitution of benzaldehyde for the genuine oil is frequently not realized, and many times oil of bitter almonds may be purchased by retail dealers which is, in truth, nothing more than the much cheaper product, benzaldehyde. The

presence of hydrocyanic acid in the oil is always certain if it be genuine and has not been treated to remove this constituent, but the presence of the acid is by no means a guaranty of its genuineness, for we will find oils consisting of benzaldehyde to which has been added the requisite amount of hydrocyanic acid to meet the requirements of the trade or of the Pharmacopœia. The U.S.P. tests are as comprehensive and exacting as we can well expect, and there is good reason to believe that an oil which will meet these tests is an excellent one; but it would appear, after an examination of results which are here submitted, that some of these requirements are erroneous, particularly the assay for benzaldehyde. Subjoined in tabular arrangement are the results of the application of the United States Pharmacopœia tests, with the exception of the benzaldehyde assay (which will be treated of separately), to twenty-two samples of oil derived from various sources:

No.	Specific Gravity at 15°	Solubility in 70 per cent. Alcohol.	Chlorinated Compounds Copper Test.	Chlorinated Compounds $AgNO_3$ Test.	Hydrocyanic Acid Qualitative.	Hydrocyanic Acid Quantitative Per cent.
1.	1·064	1·0	absent	absent	present	2·23
2.	1·063	1·0	present	present	absent	—
3.	1·054	1·0	absent	absent	"	—
4.	1·054	1·0	present	present	"	—
5.	1·055	1·0	"	"	"	—
6.	1·053	1·0	"	"	"	—
7.	1·058	1·0	"	"	"	—
8.	1·051	1·0	absent	absent	"	—
9.	1·075	0·9	"	"	present	6·44
10.	1·051	1·0	"	"	absent	—
11.	1·054	1·0	present	present	"	—
12.	1·072	0·9	"	"	"	—
13.	1·058	0 95	"	"	present	1 24
14.	1·060	1·0	"	"	absent	—
15.	1·062	0·95	"	"	present	0·69
16.	1.063	0·95	"	"	"	3·31
17.	1·053	1·0	"	"	absent	—
18.	1·058	1·0	"	"	"	—
19.	1.068	0·95	"	"	present	3·29
20.	1·068	0·95	"	"	"	3·28
21.	1 057	1·0	"	"	"	0·9
22.	1·060	1·0	"	"	absent	—

Specific Gravity.—The specific gravity recorded by the U.S P. of 1·045 to 1·060 at 25° is about equivalent to 1·052 to 1·067 at 15° C. These (1·045 to 1·060) are the limits for 15° C. as given by Gilde-

meister and Hoffmann, but more recently Schimmel & Co. (*Schimmel's Report*, April, 1906, 72) state that it should be 1·45 to 1·70 at 15°; equivalent to 1·38 to 1·63 at 25° C. Oil which is lower in specific gravity than this lower limit is suspicious and may probably contain added alcohol, which is sometimes used as a preservative, particularly in view of the fact that the chemists of Schimmel & Co. have shown (*Schimmel's Report*, April, 1895, 11) that a small quantity of alcohol materially decreases the oxidation to benzoic acid. Specific gravity higher than these limits indicates the presence of excessive quantities of hydrocyanic acid, not however as such, but in the form of benzo-nitrile produced by the interaction of benzaldehyde and hydrocyanic acid. For example, sample number 9, with a specific gravity of 1·075, will be seen by the table to have a very large quantity of hydrocyanic acid present (6·44 per cent.); the high gravity of numbers 12, 19 and 20 is probably due to the presence of considerable benzoic acid.

Alcohol Solubility.—Of the solubility requirements of the U.S.P., the one having most importance is that in 70 per cent. alcohol. This was applied by carefully measuring out exactly 5 c.c. of the oil in a graduated cylinder and adding the 70 per cent. alcohol from a burette with constant shaking until a perfectly clear solution resulted. By this means a very accurate determination of the solubility of the oil may be effected. None of the samples failed to meet this test, while some of them, it will be noted, required slightly less of the alcohol to produce a clear solution. The test is of value and, to get the most out of it, should be applied in some such manner as the above. Schimmel & Co. (*Schimmel's Report*, April, 1906, 72) consider that a pure oil requires one to two parts of 70 per cent. alcohol for solution.

Chlorinated Compounds.—The presence or absence of chlorinated compounds has been shown to be a very excellent criterion of the genuineness of the oil from the fact that natural oil does not contain any compounds which, by the application of either of these tests, show the presence of chlorine, and that benzaldehyde synthetically produced from toluene invariably contains some traces of chlorinated compounds. These chlorinated compounds may be either those produced by the introduction of chlorine direct into the benzene nucleus or compounds having the chlorine in the side-chain. This statement is made in the present tense, though it should in reality

be modified, because it is becoming possible to obtain benzaldehyde produced by chemical synthesis which shows no presence of these intermediate chlorine-bearing compounds. All the substitutions of genuine oil of bitter almonds by benzaldehyde occurring in the oils here recorded have been easily detected by the presence of such chlorinated bodies. It is interesting to note in this connection that there was at one time a controversy between the chemists of Merck & Co., and those of Schimmel & Co., the former claiming to have found traces of chlorine even in genuine oil of bitter almonds. This fact was subsequently proven to be erroneous by Schimmel & Co., and they at that time proved the efficacy of their qualitative test, giving also processes for the quantitative estimation (comparatively at least) of chlorine present both in the substituted compounds and the organic chlorides (*Schimmel's Report*, April, 1891, 3).

Copper Test.—This is the well-known test for the detection of halogens in organic compounds, and its exceeding delicacy makes it very valuable, though it is probably no more delicate than the silver nitrate test; but at least it is not undesirable to have two such excellent tests to check each other, particularly when we consider possible sources of error in silver nitrate tests, to which we will have occasion to refer later. By this test only five of the twenty-two samples were shown to be absolutely free from any trace of chlorine. These are numbers 1, 3. 8, 9 and 10, and hence may be considered genuine oils, the remainder being in whole or in part artificial benzaldehyde.

Silver Nitrate Test.—This test, which is the only one given in the U.S P., 1890, is very reliable, it being both extremely delicate when properly handled and capable of giving some approximate idea of the quantity of organic chlorine-containing bodies present. The only difference between this and the preceding test is that while inorganic and non-volatile chlorides will give no indications by this test, their presence will be demonstrated by the copper test. The U.S.P. test is so worded as to exclude any possibility of error due to the production of silver cyanide instead of silver chloride, and the consequent misinterpretation of the test, but it fails completely to take cognizance of another and very much more important source of error, and one which I do not remember having seen any notice of in this immediate connection, viz.: *the possibility of the filter paper used containing chlorides.*

Mallinckrodt and Stull (*Jour. Am. Chem. Soc.*, 1904, 1029) called attention to some difficulty they had in testing potassium iodide for iodate by reason of the presence of nitrites in the filter paper which they had used, and went on to show that all the samples of filter paper which had been kept in their laboratory showed more or less marked traces of nitrites. Procter (*Jour. Soc. Chem. Ind.*, 1904, 9), in an article regarding water analysis, also calls attention to the ready absorption of ammoniacal and acid vapors from the air of the laboratory and the necessity of washing filter papers prior to their use, which were desired to be free from any traces of these bodies. We have found the same thing to be true in the application of this silver nitrate test.

The Pharmacopœia directs that after burning the oil in the presence of water to absorb the volatile chlorine compound the resulting solution shall be filtered free from carbon and the filtrate tested by the addition of silver nitrate. By the application of this test *exactly as directed there was not a single one of the twenty-two samples that did not show a more or less distinct test for chlorides in the aqueous solution.* The water used was found to be absolutely free from the minutest taste of chlorine, and in looking further for a possible source of error, it was found that not a filter paper in the laboratory but would give at least a slight test for chlorine when extracted with water. The tests on these filter papers included every variety in stock, from the heaviest sheet filter to the various grades of Schleicher & Schüll's quantitative filters. An aqueous extraction of the filters also showed the presence of ammonia by Nessler's reagent, so that this source of error is due to the absorption from the atmosphere of the laboratory of the vapors of ammonia and hydrochloric acid, the resulting ammonium chloride being readily extracted, in part at least, by the passage of even a small quantity of water through the filter. Two methods may be adopted to obviate this source of error: *First*, the filter papers used may be washed carefully with water free from chlorine immediately before use; or, *second*, the test for chlorides may be made without filtering off the carbon produced in process of the test. The second method is preferable, as it renders unnecessary the additional time and trouble to wash the filter, and the finely divided carbon floating on the surface of the liquid does not in any way interfere with the delicacy of the test. Thus the clos-

ing section of the description of this test in the U.S.P. should be so modified in wording as to obviate the fallacy of its present reading.

Hydrocyanic Test, Qualitative.—This well-known test requires no comment, and we may pass it by, merely calling attention to the fact that six of the samples, which were in whole or part evidently artificial benzaldehyde, yet contained hydrocyanic acid, showing that an attempt had been made to duplicate more nearly the genuine oil.

Hydrocyanic Acid Estimation.—The determination of hydrocyanic acid present in oil of bitter almonds may be accomplished with a fair degree of accuracy with the method given in the U.S.P., and although the U.S.P. specifies that magnesium hydroxide free from chlorides shall be used, yet an hydroxide containing chlorides will be equally useful if a blank test be run alongside of the assay. The quantities found range from 0.69 per cent. in number 15 to the very high figure of 6.44 in number 9, which sample is also the one having the highest specific gravity. Numbers 13 and 31 are below the U.S.P. standard, while the remaining four are within the limits of 2 to 4 per cent. Three of these four, however, it will be seen by reference to the chlorinated compound test, were not natural oils.

Benzaldehyde Estimation.—Few practical problems in connection with the whole field of volatile oil analysis have recently attracted more attention than the methods for the estimation of aldehydic or ketonic constituents. The method of estimating such constituents by use of acid or neutral sulphite of sodium received its early and widest application to the estimation of citral in lemon oil, but has since been extended to various other oils, and among the more recent applications of the method is that to oil of bitter almonds. In connection with work upon a large number of oils of this character, Burgess (*Analyst*, 1904, 78) applied the method to benzaldehyde and oil of bitter almonds, and carried out the estimation by measurement of the uncombined oil. More recently, S. S. Sadtler has applied the observations of Tiemann (*Berichte*, 31, 3334), who demonstrated the liberation of alkali by the action of sodium sulphite on an aldehyde, to the determination of various aldehydes and among them benzaldehyde in oil of bitter almonds. In a paper read before the Chemical Section of the Franklin Institute (*Jour. Franklin Institute*, December 1903) he described a method for the quantitative estimation of aldehydes and ketones based upon this reaction and the determination of the alkali formed. Another article of similar

character appeared in the *Journal of the Society of Chemical Industry*, 1904, 303, wherein he mentions an attempt to apply this reaction to the determination of benzaldehyde in oil of bitter almonds, and states that they gave "results varying about one-third of the theoretical." Sadtler's latest contribution on this subject (*Jour. Amer. Chem Soc.*, 1905, 1321) deals with the benzaldehyde determination slightly more *in extenso*. He gives results obtained in the estimation of benzaldehyde in a good quality of the commercial article, which ranged on the same sample from 96·8 per cent. to 99 per cent. No other analytical results are recorded, but we are led to conclude that the method works well, although the operation must be carried out entirely in the cold, the avoidance of heat being absolutely necessary. It is from this work that the U.S.P. method of assay is probably derived.

Judging by the results below, it seems that the introduction of this method of assay into the Pharmacopœia has been a little premature, for I have been unable to obtain results that are reliable, and it further appears that the same conclusions regarding this matter have been reached by the chemists of Schimmel & Co. They say (*Schimmel's Report*, 1905, 30) "we were compelled to reject the use of Sadtler's method for the estimation of citral in lemon oil because an exact titration could not be carried out," and again (*Schimmel's Report*, April–May, 1906, 70, 74 and 122) they reiterate this opinion. This is exactly the difficulty which I have encountered as being the most serious one.

The application of this assay to sample number 1, which was a sample of the genuine oil from Fritzsche Brothers, and which answered all the other U.S.P. tests, gave the following results:

69·19 per cent.	68·06 per cent.
70·5 " "	69·46 " "
68·93 " "	69·34 " "

The average of these results is 69·25 per cent., and the extreme variation among these is 2·54 per cent., which, when we consider the method of assay, is sufficiently close agreement for all practical purposes. In view of the requirement of the U.S.P. that oil of bitter almonds should contain 85 per cent. of benzaldehyde, these results may be looked upon with suspicion as showing *not* a poor quality of oil, but the shortcomings of the process. The quantity of benzoic acid present, as shown by two assays, was 0·95 and 0·98

per cent., which shows that the small amount of benzaldehyde is not caused by an excessive oxidation to benzoic acid. To further try the process, a sample of high-grade commercial benzaldehyde was obtained and assayed. This sample had a specific gravity of 1.053 at 15° C. and in fractional distillation gave the following results:

Pressure, 739 m.m.

	Per Cent.		Per cent.
177° to 178°	4	179° to 179.5°	10
178° " 178.5°,	26	179.5°, " 180°	5
178.5° " 179°,	45	Not distilled.	10

The distillation was from an ordinary distilling flask and over a free flame without any special protection of the upper part of the distilling flask. Three assays of this benzaldehyde gave as results 79.8 per cent, 80.12 per cent., and 80.07 per cent., which determinations are very close indeed. The amount of benzoic acid present in this benzaldehyde was very small, amounting to nothing more than a distinct trace. Here, again, we have results which are 5 per cent. below the U.S.P. standard, showing that the assay process used is certainly at fault in some particular.

The results above given, both on the oil and the benzaldehyde, as obtained by the writer, were duplicated within the limits of their variations by another analyst, so that the trouble is evidently not due to a misreading of the end-point.

Still, a third sample, which was marked "Oil of Bitter Almonds, Artificial," assayed 78.4 per cent.

As we have stated, the chief difficulty with the process is the uncertainty attendant upon the determination of the end-point, and while Sadtler recommends rosolic acid as giving better results, I rather prefer phenolphthalein. Unless extreme care be taken, particularly if one is unacquainted with this process, the end-point will be considered reached before such is actually the case, for the final pink tint of the phenolphthalein is exceedingly faint. For this reason it is absolutely essential that the titration should be carried out in full daylight, a cloudy day even being detrimental to the best results. It is evident that results which are fairly concordant may be obtained, but it seems equally evident that concordance of results is not indicative of accuracy. It is of interest to note here the statements in the first article of Sadtler's dealing in any way with the assay of benzaldehyde by this process, wherein he says that it gave

results varying about one-third of the theoretical, as compared to the implied, though not definitely worded statement in the last article upon the same subject, that the process is accurate. So far as I have been able to find, he has given no explanation of this wide variation from the theoretical and why at the present time the method is to be regarded as satisfactory. Certain it is that these results accord far better with the earlier statement.

Opportunity has been wanting to enter into this process in detail with a view of rendering it more accurate, and so perforce the results here submitted are destructive without being in addition constructive.

FROM THE LABORATORIES OF PARKE, DAVIS & CO.

NOTES ON PROTEID IRON SOLUTIONS.[1]

BY WILLIAM H. HARRISON.

LIQUOR FERRI PEPTONATI.

The present National Formulary formula yields a product which is a thick red-brown liquid, with a very disagreeable gluey odor. It is clear in neither reflected nor transmitted light, and of such a colloidal nature as to render filtration impossible even under greatly increased pressure. The taste is at first pleasant, followed by a strongly alkaline and ferruginous after-taste, which persists.

Heated to above 60°, the iron is precipitated as ferric hydroxide, partly free and partly in combination with peptone. Carbon dioxide causes the complete precipitation of the iron in combination with peptone and albumoses. The iron content is ·735 per cent.

In the preparation of the above compound the formula directs that dry peptone be employed. There is nothing to be gained in the use of dry peptone. On the contrary, this is the greatest objection to the present formula.

A. Catillon (*Pharm. Journ.* (3), XI (1881), 759) points out the fact that even in the most carefully prepared dry peptone a strong unpleasant odor persists, while freshly prepared solutions of peptone from egg albumen are almost free from odor. Most of the com-

[1] Read before the Chicago Branch of the American Pharmaceutical Association.

mercial peptone on the market is made from fish, serum and egg albumen of varying quality, either by peptic or pancreatic digestion, while not a small quantity is made by the digestion of meat in the presence of hydrochloric or tartaric acid with superheated steam. The products are as varied as the number of raw materials entering into their preparation.

Peptones from meat are always more or less contaminated with meat bases, gelatin, etc. That from fish albumen always has a fishy odor. The products from either source are prone to rapid putrefaction and yield iron combinations of most offensive odors.

Allen has pointed out that commercial peptones are often adulterated with gum, dextrin, sugars, flour, etc. He cites (Allen, Vol. IV, pp. 290–292) that of five samples analyzed, only one contained over 6 per cent. of real peptone and three contained less than 1 per cent.

According to A. Denaeyer, the so-called peptones, which are produced by the action of superheated steam on meat, contain no true peptone. The preparation of peptone in this manner is the subject of a patent by Etieme and Delhaye (Eng., 1890, No. 10,961).

The three samples of peptone used in the preparation of the samples of liquor ferri peptonati, upon which this criticism is based, may be described thus:

I. "Peptone from egg albumen" contains 30 per cent. insoluble matter, chiefly starch. It is a white powder with a slightly starch odor and forms a faintly yellowish solution with water.

II. "Peptone, meat," a dark brown hygroscopic mass, with a strong odor of meat bases and glue. Almost completely soluble, giving a yellowish-brown solution.

III. "Peptone, pure." A light yellow powder, soluble in water. Odor strong, glue-like.

The three above samples were all that were obtainable on the Chicago market, and fairly represent, I think, the peptones available for the present National Formulary preparation.

A wholesome solution of peptone may be readily obtained by the digestion of fresh egg albumen by pepsin in the presence of hydrochloric acid. The best results (*i. e.*, 70 per cent. albumoses and peptone) are obtained by digesting the egg albumen at 40° C. for six hours, in the presence of ·5 per cent. hydrochloric acid.

A good peptonized iron is readily soluble in a warm dilute solu-

tion of sodium citrate, the resultant solution being perfectly clear, with a rich claret color, odorless and free from ferruginous taste. Further, this solution is not rendered turbid by carbon dioxide or by boiling. These points prove, I think, a dilute solution of sodium citrate a better solvent for peptonized iron than sodium hydroxide, where peptonized iron is to be employed in solution.

Solution of ferric chloride may be advantageously employed in place of the more expensive oxychloride solution in the preparation of peptonized iron. It yields a product which is not only more completely but more quickly soluble in either sodium hydroxide, sodium citrate or hydrochloric acid.

I have been unable to prepare a satisfactory solution of peptonized iron by the use of the oxychloride solution. The solution so made is clear only by strong transmitted light. In view of the above facts, which are supported by exhaustive tests covering some four months, I have constructed the following formula, which yields not only a more beautiful and more palatable product, but one of perfect stability:

Egg albumen, fresh	125 gm.
Hydrochloric acid	15 c.c.
Pepsin	1 gm.
Sol. ferric chloride, U.S.P. 8th	60 "
Ammonium hydroxide	48 c.c.
Sodium citrate	20 gm.
Alcohol	100 c.c.
Aromatic elixir	100 "
Tincture vanilla	100 "
Angelica wine	100 "
Sodium hydroxide	
Water	q. s.

Dissolve the egg albumen in 2,000 c.c. of water, add the hydrochloric acid and the pepsin and digest at 40° C. for six to twelve hours, or until the solution gives no precipitate of albumen on boiling. Filter. Dilute the ammonium hydroxide with an equal volume of water and add the resultant solution to the solution of ferric chloride in small portions, skaking well and waiting after each addition until the precipitate which is formed is redissolved. When all has been added, dilute to 2,000 c.c. Mix the two solutions thoroughly and add sufficient dilute sodium hydroxide solution (25 c.c. official solution to 100 of water) to render the mixture faintly alka-

line to sensitive litmus paper. Transfer to a tall cylinder and allow to stand until the precipitated peptonized iron has subsided (over night); then decant off the supernatant liquid and wash repeatedly by decantation with water until the washings give but a faint opalescence with silver nitrate solution. If the precipitate does not settle readily or settles incompletely, as often happens, after the slight excess of alkali has been washed out, again render the mixture faintly alkaline. A slight excess of the alkali (about 2 c.c. of ·5 per cent. NaOH per liter) effects the rapid and complete settling of the precipitate.

Transfer to a fine muslin strainer and drain. Transfer the magma to a porcelain dish.

Dissolve the sodium citrate in 50 c.c. of boiling water and pour the solution over the magma in the dish. Heat until all is dissolved. Cool and add the alcohol, aromatic elixir, tincture of vanilla, angelica wine and enough water to make 1,000 c.c. Filter if necessary.

The finished preparation is a perfectly clear claret-colored solution, with no odor except that imparted by the flavoring ingredients. Taste sweetish, faintly aromatic, with not a trace of astringency. Samples made four months ago have kept perfectly.

I have selected ·6 per cent. iron as the iron content in place of ·735, as it seems to be the more universally accepted strength of solutions containing proteid iron combinations.

Numerous attempts to modify the above formula have resulted in rendering the product less satisfactory. A good quality of dry egg albumen (15 grammes) may be used without altering the nature of the product to any extent. Solution of oxychloride of iron (164 c.c.) used in place of the solution of ferric chloride and ammonium hydroxide lessens the number of times the precipitated peptonized iron must be washed, but the finished product in this case is quite turbid.

I have cut down the amount of aromatic elixir from 400 c.c. to 100 c.c., because of numerous complaints that the preparation of the National Formulary is too sweet, and to make it more consistent with the liquor ferri peptonati cum mangano. The addition of the tincture of vanilla and angelica wine has rendered the aroma and taste of the finished product all that is to be desired.

LIQUOR FERRI PEPTONATI CUM MANGANO.

When made according to the present formula, with the materials obtainable on the market, the National Formulary preparation may be described thus:

A dark brown sluggish liquid, with a most offensive odor, not unlike a mixture of ammonia and putrefied beef extract. Taste alkaline, saline and nauseating. It deposits after a time a dirty white sediment, which soon covers the bottom of the vessel.

The finished product contains about ·15 per cent. iron, ·145 per cent. or less manganese, and ·234 per cent. ammonium hydroxide, the latter serving the sole purpose of developing more offensive odors.

I have prepared four samples, in each case using different samples of peptonized iron, the finished products being almost identical.

The trouble with this preparation lies principally with the peptonized iron and ammonium hydroxide, although there is room for improvement elsewhere.

Of six samples of peptonized iron examined, the products of the principal manufacturers of pharmaceutical chemicals, all showed that putrefaction was in progress. Of seven examined for iron content, only one showed over 5 per cent. Fe_2O_3 (3·5 per cent. Fe), and this one sample has not yet been on the market under the name of peptonized iron or iron peptonate.

At the time this work was started, but two samples of iron peptonate and none of soluble manganese citrate were obtainable on the Chicago market.

After some time I succeeded in collecting some direct from the manufacturers, seven samples of peptonized iron and two of soluble manganese citrate.

These two samples of soluble manganese citrate, although bearing the same title, are entirely different substances.

(1) A light red-brown powder with a strong odor of acetamide and ammonia. It is a manganese-ammonium citrate containing about 18 per cent. manganese. Incompletely soluble in water, but solution is rendered clear by standing for some time with a slight excess of ammonia.

(2) Pearl-colored scales (evidently made after the formula of F. B. Power, Proceedings A.Ph.A., 1902, 937). Contains 13·5 per

cent. manganese. It is a manganese sodium citrate, freely water-soluble.

There are at least two additional soluble manganese citrates, but no sample of these was found on the market. (I have myself prepared the four scale salts and will make these the subject of a future paper.)

Which of the scale salts of the market is to be used? One gives the finished product a manganese content of about ·145 per cent., the other about ·108 per cent. The latter yields a product of about the same manganese content as the solution approved by the Committee on Pharmacy and Chemistry of the A.M.A.; but in Proceedings A.Ph.A., **51**, 400, we are told that the former was intended. But why use these scale salts of variable composition at all? The normal manganese citrate is a definite chemical compound containing 23 per cent. Mn. It is freely soluble in ammonium hydroxide or sodium citrate solution. It costs about one-half as much (per gramme manganese) as the double salts.

In view of the above facts, it seems that a satisfactory preparation according to the present N. F. formula is impossible, although with a good sample of peptonized iron it could yield a passable one. A sample of peptonized iron which promises to keep well (containing about 15 per cent. Fe) has been prepared by the writer, but the formula is withheld until it can be proven to keep satisfactorily.

A liquor ferri peptonati cum mangano may be prepared, however, by slightly modifying the formula of liquor ferri peptonati. All that is necessary is to increase the amount of sodium citrate to 25 grammes, and dissolve in the solution of this salt in water 4·4 grammes normal manganese citrate before adding it to the peptonized iron.

The finished product leaves little further to be desired and is identical with liquor ferri peptonati, except that it contains in addition ·1 per cent. manganese.

Attempts to supply the manganese by means of manganese chloride resulted in the product having an objectionable salty taste.

The iron and manganese cannot be precipitated together as peptonized compounds, because in the presence of ammonium chloride the peptonized iron requires too large an excess of alkali for complete precipitation, while in the absence of the ammonium salt (*i. e.*, from iron oxychloride solution) the peptonized iron precipitates in

such a way as to form turbid solutions with sodium citrate solution or alkali.

It will be seen that the same "base" forms the body of both preparations. This has a decided advantage in that further combinations are possible.

If the formula for L. F. P. be completed to the point where the peptonized iron is dissolved in the solution of sodium citrate and alcohol added, it will have a volume less than 400 c.c. It may be diluted to this volume and filtered. It will now keep indefinitely, and may be designated "liquor ferri peptonati base."

To prepare liquor ferri peptonati, N. F.:

Base	400 c.c.
Aromatic elixir	100 "
Tincture vanilla	8 "
Angelica wine	100 "
Water, q. s. to make	1000 "

Liquor ferri peptonati cum mangano:

Base	400	c.c.
Manganese citrate, normal	4·4	grammes.
Sodium citrate	5	"
Aromatic elixir	100	c.c.
Tincture vanilla	8	"
Angelica wine	100	"

Dissolve the sodium citrate in 10 c.c. of water and add to this the manganese citrate. When all is dissolved, add the solution to the base and then add the other ingredients.

Liquor ferri peptonati cum mangano et arseno.

Base	400	c.c.
Manganese citrate	4·4	grammes.
Sodium citrate	5	"
Arsenous oxide	·325	"
Potassium bicarbonate	·7	"
Aromatic elixir	100	c.c.
Tincture vanilla	8	"
Angelica wine	100	"

Dissolve and add the manganese citrate as in liquor ferri peptonati cum mangano. Dissolve the potassium bicarbonate in 10 c.c. water and heat with the arsenous oxide until all is dissolved. Add to the mixture already prepared. Then add the flavoring ingredients and sufficient water to make 1,000 c.c. The finished solution contains:

Fe ·6 per cent., Mn ·1 per cent., and As_2O_3 ·0013 gramme (1-50 gr.) per 4 c.c.

Liquor ferri peptonati cum mangano, arseno et strychnina.

Base . . . . . 400 c.c.

Solution of 4·4 grammes manganese citrate as above, solution of 0·325 As_2O_3 as above, then add a solution of ·162 gramme strychnine sulphate in 5 c.c. of water. Next add the flavoring ingredients and water sufficient to make 1,000 c.c.

This solution contains: Fe ·6 per cent. Mn ·1 per cent., and each 4 c.c. ·0013 gramme (1-50 gr.) As_2O_3, and ·00065 gramme (1-100 gr.), strychnine sulphate.

All these formulas have been prepared and thoroughly tried and found to meet the demands for these preparations.

It may be well to add that the above solution of peptonized iron has a wonderful power in the masking of the taste of alkaloids.

LIQUOR FERRI ALBUMINATI.

The National Formulary product is a brownish-yellow liquid, clear in neither transmitted nor reflected light. Taste aromatic, sweet, then slightly astringent. The solution cannot be filtered, and a more or less gelatinous precipitate soon appears. The National Formulary states that each 4 c.c. contains about ·026 gramme Fe, (corresponding to ·65 per cent. Fe), yet the 130 c.c. of oxychloride solution can only furnish an iron content of ·47775 per cent. The solution cannot be considered acceptable.

The formula calls for dried egg albumen, good qualities of which are not easily obtainable, at least on the drug market, although dealers in bakers' supplies have some excellent samples. The commercial article is largely adulterated. Of four samples examined, but one was fit for use in the N. F. formula.

With good dried egg albumen hard to procure, it seems preferable to use fresh egg albumen so readily obtainable. It represents about 12 per cent. dried albumen.

Solution of ferric chloride yields a completely soluble albuminated iron, and should be used in place of the solution of oxychloride of iron which yields an incompletely soluble albuminate.

A reconstructed formula based on these points yields a product which has a beautiful claret-red color, and is an acceptable preparation.

Egg albumen	400 grammes.
Solution of ferric chloride, U.S.P. 8th	15 "
Ammonium hydroxide	12 c.c.
Alcohol	120 "
Aromatic elixir	400 "
Solution of sodium hydroxide	
Water, of each sufficient quantity.	

Dilute the ammonium hydroxide with an equal volume of water and add the resultant solution to the solution of ferric chloride in small portions at a time, shaking vigorously and waiting after each addition until the precipitate formed is redissolved. When all has been added, dilute with 1,000 c.c. of water and heat to 50° C.

Shake the egg albumen with a few pieces of broken glass and 1,000 c.c. of water, strain, filter and heat to 50° C. Filter into the diluted iron solution, under constant stirring. When all has been added, add cautiously a dilute solution of sodium hydroxide (2 vol. 5 per cent. to 8 vol. water) until the mixture is perfectly neutral to sensitive litmus paper (about 200 c.c. of the dilute alkali being required; *an excess must be avoided lest the precipitate be redissolved*), whereupon the precipitate readily settles, leaving a clear, colorless supernatant liquid. Now add 2,000 c.c. of distilled water at 50° C., transfer to a tall jar and allow the precipitate to settle. Wash by decantation with water at 50° C. until the washings give no test for chlorides. (This may be told by boiling about 2 c.c. of the supernatant liquid, filtering and testing for Cl on the filtrate by means of HNO_3 and $AgNO_3$.) If during the washing the precipitate does not settle readily, it shows the presence of a little acid in the water (even the carbon dioxide usually present in distilled water causes the precipitate to settle slowly); this should be neutralized with dilute alkali, about 1 c.c. of 1 per cent. NaOH per liter being sufficient.

The precipitate is then drained and the excess of water pressed out. Transfer the magma to a porcelain dish and dissolve in a mixture of 12 c.c. solution of sodium hydroxide and 25 c.c. of water. When solution is complete, add the alcohol, aromatic elixir and enough water to make 1,000 c.c. Filter. The finished product is perfectly clear in transmitted light and very faintly turbid by reflected light. Its iron content is about ·6 per cent.

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THE QUANTITATIVE ESTIMATION OF BENZOIC ACID IN CATSUP.

By Charles H. LaWall and Henry A. Bradshaw.

The quantitative estimation of benzoic acid in catsup has hitherto been attended with some difficulty on account of the fact that there is usually a great tendency to emulsification, which can be counteracted only by extreme dilution of the catsup; also, the benzoic acid, being obtained by the shaking-out process, requires to be purified by sublimation. The following process has proved to be almost free from these defects, and work upon known samples has given repeatedly concordant results, agreeing within one or two-hundredths of 1 per cent. It is as follows:

Catsup, 20 grammes; sodium chloride, 2 grammes; hydrochloric acid, 5 c.c.; saturated solution of sodium chloride, 25 c.c. Shake the mixture thoroughly for about five minutes, transfer to a moistened filter and collect the filtrate in a receiving vessel graduated to 100 c.c. Wash the residue upon the filter with a saturated solution of sodium chloride until 100 c.c. of filtrate have been obtained. Transfer the filtrate to a separatory funnel and shake out with three portions of chloroform, using 25 c.c., 15 c.c. and 10 c.c., respectively. Evaporate the chloroform at room temperature. If the residue is perfectly white and crystalline, as is usually the case, dry to constant weight over sulphuric acid in a desiccator. If the residue is slightly yellowish and oily, which rarely occurs, dissolve it in about 10 or 15 c.c. of weak ammonia water, filter into a separatory funnel, washing the filter and funnel with water. Acidulate with dilute sulphuric acid, and again shake out with chloroform. The white, crystalline residue of benzoic acid, as obtained by drying in a desiccator, may be weighed, preparatory to checking up by titration.

After obtaining the weight, from 3 to 5 c.c. of alcohol are added to dissolve the residue in the capsule from which the chloroformic solution has been evaporated, a few drops of phenolphthalein solution are added, and the solution is titrated with twentieth normal potassium hydroxide solution, and the results calculated to benzoic acid. The titration should agree with the gravimetric estimation very closely, the difference rarely being more than 1 or 2 milligrammes. The solution resulting from the titration, which is very

slightly alkaline, is then divided into two portions, to one of which is added a solution of manganous sulphate, for the purpose of ascertaining the presence or absence of cinnamic acid, Prof. W. L. Scoville having recently called attention to the fact that benzoic acid does not produce a precipitate with manganous sulphate, while cinnamic acid does. To the other portion is added solution of ferric chloride for the purpose of confirming the presence of benzoic acid. The amount of benzoic acid, as determined by the foregoing process, may be calculated as sodium benzoate, as it is in this form when added to the catsup, and in terms of which it is stated on the label.

This process is applicable, of course, only where benzoic acid is the sole preservative used, as salicylic acid and saccharin are both extracted by this method, and unless their absence was assured, would be estimated as benzoic acid.

The principle upon which the above process is based is that outlined by Prof. F. X. Moerk in the "Proceedings of the Pennsylvania Pharmaceutical Association" for 1905, page 181, in an article on the detection and estimation of benzoic acid and salicylic acid in milk, in which he advocates the use of sodium chloride and hydrochloric acid in assisting in the extraction of these preservatives in the pure state and preventing emulsification during the process.

SUGGESTIONS FROM THE BRITISH PHARMACEUTICAL CODEX.

By M. I. Wilbert,

Apothecary at the German Hospital, Philadelphia, Pa.

No English-speaking pharmacist who is at all interested in the science of his calling can afford to ignore the British Pharmaceutical Codex, or even attempt to conduct an up-to-date pharmacy without a copy of this really valuable compendium.

Even a cursory inspection of this book must suggest that it promises to be an active factor in encouraging rational prescribing on the part of medical practitioners, and it will surely prove to be a powerful incentive to the development of an active interest in the science of pharmacy on the part of the votaries of that calling.

While the monographs and the descriptions of drugs and chemi-

cals are of unusual interest and contain much that is novel and valuable, the formulæ for galenical preparations that are contained in this book are even more interesting to American pharmacists, as many of them will be found to be particularly useful, or at least suggestive, in connection with the present-day propaganda for the use of official or open formula remedies in place of the semi-secret proprietaries and out-and-out nostrums that appear to be so popular at the present time.

In this connection it will perhaps not be necessary to reiterate the oft-made statement that the dispensing pharmacist, if he desires to give generally satisfactory service, must enlarge on his possibilities and resources so as to be in position to compete with the manufacturer in the preparation of all of the available dosage forms of medicine. To do this it will be necessary to be ever on the look-out for suggestions that will lead to the development of new forms for the administration of active medicaments, to improve on the well-known present-day forms and to be able to demonstrate that in all particulars the product of the dispensing pharmacist is at least the equal and, in some respects is decidedly superior to the best that the manufacturer may have to offer.

Few, if any, books on pharmacy that have come to my attention offer a greater number of suggestions along these very lines than the British Pharmaceutical Codex, and for this reason alone, if for no other, the book would be a valuable addition to the dispensing room of any well-organized pharmacy.

One of the more interesting features, and one that is comparatively novel on this side of the water, as the Englishman would say, is the use of chocolate as a vehicle. We have, it is true, made use of chocolate, or the color of this substance, in the form of variable mixtures of oxide of iron, starch and sugar, to some extent as a coating for pills, but as yet the paste itself has not been widely exploited as a vehicle in the production of extemporaneous preparations at the prescription counter.

Theobroma Paste.—In the British Pharmaceutical Codex this substance is directed to be used in the preparation of a class of preparations designated as Tabellæ. The directions for the making of this particular class of preparations are simple and readily followed, and it will be quite practicable to dispense these extemporaneously.

Theobroma paste is recommended as a vehicle for such sub-

stances as menthol, pepsin, santonin, the insoluble salts of bismuth and a number of the alkaloids.

Phenolphthalein Lozenges.—Trochisci phenolphthaleini, B.P C., are also directed to be made with chocolate paste and represent approximately 2 grains each of phenolphthalein.

Lozenge Base.—The article on lozenges is a comprehensive one and should be worth many times the price of the book to any up-to-date pharmacist. Cut lozenges constitute a class of preparations that is much neglected and deserves to be brought to the attention of physicians. The Codex contains modified formulas for the official British bases, the more useful of which are:

LOZENGES WITH FRUIT BASIS.

Refined sugar	88
Gum acacia, in powder	4
Mucilage of acacia	7
Black currant paste	11

Distilled water, a sufficient quantity.
Mix and divide into 100 lozenges.

LOZENGES WITH TOLU BASIS.

Refined sugar	96
Tincture of tolu	2 c.c.
Gum acacia, in powder	4
Mucilage of acacia	7

Distilled water, a sufficient quantity.
Mix and divide into 100 lozenges.

Compressed Tablets.—The directions for making compressed tablets are particularly well adapted to the production of these articles on a small scale. The vehicles used for granulating the several substances are those suggested by White and Robinson in a paper read at the meeting of the British Pharmaceutical Conference some five years ago.

While these substances are undoubtedly useful for many of the possible combinations of drugs, and have the added advantage that the granulations are readily dried by exposure at ordinary temperatures, they should not be relied on too implicitly, particularly for tablets that are to retain a purely white color.

For extracts and mixtures containing extracts, the more preferable is:

ETHEREAL SOLUTION OF THEOBROMA.

Oil of theobroma	16·5

Ether, sufficient to produce 100.

THEOBROMA EMULSION.

Oil of theobroma	25·00
Hard soap	3·00
Tragacanth, in powder	0·50
Benzoic acid	0·25
Distilled water, to produce	100.

Dissolve the soap in 25 of the water by the aid of heat, add the hot solution to the oil of theobroma, previously melted, and mix by agitation, then shake in the tragacanth, add the benzoic acid and make up to 100 with distilled water.

Where the presence of soap is considered undesirable, 15 of gum acacia may be substituted for the soap.

Pastilles.—These are directed to be made with a basis of glycogelatin, with which, when melted on a water-bath, the active medicinal agent is incorporated, either in solution or suspension. The melted mixture is then directed to be poured into moulds or into a suitable tray, allowed to solidify, and then cut into the required number of pastilles.

Glycogelatin.—The formula for glycogelatin, B.P.C., the basis for pastilles, is as follows:

Gelatin	12·00
Glycerin	40·00
Distilled water	20·00
Orange-flower water	20·00
Sugar	5·00
Citric acid	2·00
Oil of lemon	0·10
Solution of caramel, a sufficient quantity.	

Concentrated Waters.—Aquæ concentrata, B.P.C. The directions of the British Pharmacopœia for medicated waters involve the distillation of the product from the crude drugs. Concentrated waters have evidently been included in the Codex to provide for a ready method of extemporaneous preparation. They are described as being solutions of volatile oils in alcohol, or mixtures of alcohol and water, and are designed for the extemporaneous production of medicated waters. Ten formulas are included, and these are so designed that one part of the product is the equivalent of about 40 parts of the official medicated water. The resulting medicated waters are directed to be clarified by the intervention of calcium phosphate. Apart from being a matter of interest, this particular

class of preparations has little or nothing to commend it. The addition of alcohol to a volatile oil in the making of medicated waters is of doubtful utility, and the use of calcium phosphate as an absorbent powder is open to the objection that this substance, in addition to being subject to contaminations, is itself slightly soluble in water.

A more valuable addition, and one that pharmacists and others in this country would, no doubt, desire to have an authoritative standard for, is:

NORMAL SALINE SOLUTION, SOLUTION SALINA, B.P.C.

Sodium chloride	0·95
Water, sufficient to produce	100.

Boil the water, cool and dissolve the salt.

There are a number of miscellaneous preparations that are of interest at the present time, in connection with our efforts to popularize open-formula preparations. An alkaline antiseptic preparation somewhat similar in character to the alkaline antiseptic of the National Formulary is:

COMPOUND GLYCERIN OF THYMOL, GLYCERINUM THYMOL COMPOSITUM, B.P.C.

Sodium bicarbonate	1·00
" biborate	2·00
" benzoate	0·75
" salicylate	0·50
Menthol	0·03
Thymol	0·05
Oil of pine	0.05
Eucalyptol	0·13
Oil of wintergreen	0·03
Glycerin	10·00
Alcohol	2.50
Solution of carmine	0·50
Distilled water, sufficient to produce	100.

Dissolve the sodium salts in the water, add the glycerin and solution of carmine; then add the menthol, thymol and oils previously dissolved in the alcohol.

This preparation will be found to be generally more acceptable than the corresponding preparation of the National Formulary. This suggests the suspicion that somewhere in the transcribing of the formula for the liquor antisepticus alkalinus, N.F., the quantities for the sodium benzoate and the sodium biborate have become trans-

posed. A reversal of these quantities produces a surprising change in the character of the preparation and eliminates the objectionable sweet taste to which many object.

SYRUP OF FIGS, SYRUPUS FICORUM, B.P.C.

Figs, cut small	40·00
Refined sugar	50·00
Distilled water, sufficient to make	100·00.

The figs are digested with boiling water and the resulting strained liquor evaporated to produce the required volume of syrup on the addition of the sugar. The resulting syrup is rather viscid and promises to be an excellent vehicle for acrid or bitter substances.

An excellent illustration of its varied uses is:

COMPOUND SYRUP OF FIGS, SYRUPUS FICORUM COMPOSITUM, B.P.C.

Compound tincture of rhubarb	5·00
Fluidextract of senna	10·00
Spirit of cinnamon	1·25
" " nutmeg (10%)	1·25
Fluidextract of cascara sagrada, aromatic	5·00
Syrup of figs, sufficient to make	100·00.

The ingredients here have been altered to comply with the U.S.P., as the fluidextract official in the British Pharmacopœia is directed to be made from senna pods.

A type of the viscid expectorants is:

LINCTUS OF ACETOMORPHINE, LINCTUS ACETOMORPHINÆ, B.P.C.

Acetomorphine hydrochloride	0·10
Tincture of hyoscyamus	7·50
Spirit of chloroform	7·50
Syrup of tolu	15·00
" " wild cherry	15·00
Glycerin, sufficient to produce	100·00.

A tooth powder that promises to find favor is:

MAGNESIUM PEROXIDE WITH CHALK, MAGNESII PEROXIDUM CUM CRETA, B.P.C.

Magnesium peroxide	10·00
Hard soap, in powder	2·50
Menthol	0·10
Oil of rose	0·25
" " wintergreen	0·50
Precipitated chalk, heavy, sufficient to make	100·00.

Triturate the menthol and oils with a portion of the precipitated

chalk, add the soap and the magnesium peroxide and sufficient precipitated chalk to take up the required weight.

Three external remedies that will probably prove useful are:

COMPOUND METHYL SALICYLATE OINTMENT, UNGUENTUM METHYLIS SALICYLATIS COMPOSITUM, B.P.C.

Methyl salicylate	12·50
Menthol	2·50
Oil of eucalyptus	2·50
Essential oil of camphor	2·50
Hydrous wool-fat	25·00
Paraffin ointment, sufficient to produce	100·00.

Mix.

COMPOUND LINIMENT OF BIRCH, LINIMENTUM BETULÆ COMPOSITUM, B.P.C.

Menthol	5·00
Oil of eucalyptus	10·00
Methyl salicylate, sufficient to produce	100·00.

Dissolve the menthol in the liquids.

LUBRICANT PASTE, PASTA LUBRICANS, B.P.C.

Carbolic acid	3·00
Glycerin	10 00
Tragacanth	2·50
Distilled water, sufficient to produce	100·00.

Dissolve the carbolic acid in 80 of the water, then mix the glycerin with the tragacanth, add the aqueous solution gradually, with constant stirring, and make up the required volume by the addition o distilled water.

A preparation of castor oil that will serve as the basis at least for similar peparations is:

AROMATIC CASTOR OIL, OLEUM RICINI AROMATICUS, B.P.C.

Amyl acetate	0·10
Saccharin	0·30
Alcohol	5.00
Castor oil, sufficient to produce	100·00.

Dissolve the amyl acetate and the saccharin in the alcohol, then add the castor oil.

The quantity of saccharin in this preparation can readily be reduced and the flavoring can, of course, be changed to suit. Given with milk or from a wetted spoon, the preparation is quite acceptable.

HELEN ABBOTT MICHAEL: AN APPRECIATION.

By Edward Kremers.

Helen Cecilia De Silver Abbott, youngest child of James Abbott and Caroline Montelius, was born in Philadelphia, December 23, 1857. After a careful home education under governesses and private teachers, who, without exception, were delighted with her affectionate and studious disposition and her extraordinary quickness of mind, she was inclined to make a specialty of music, a genius for which she early manifested.

She went abroad in 1878, spending the winter in Paris. In May, 1879, she returned to America, but the season 1880–81 again finds her in Paris engaged in the study of chamber music. Returning once more to Philadelphia, she took up the study of musical composition.

A copy of Helmholtz's work on optics, purchased in one of the second-hand book stalls on the quays along the Seine, caused her to seek instruction in physics. From optics her "interest ran to zoölogy and to the dissecting of animals." Next she enters "the Woman's Medical College as the open sesame to the undiscovered lands." She "passed the first year's examinations in chemistry, anatomy and physiology with a record of one hundred in each branch." During the second year of her medical studies "she met with a serious accident that interfered with her work, yet she passed the examinations with the same record as in the previous year."

During the previous year she had published a short paper entitled, "Some Observations on the Nutritive Value of Condiments," published in *The Polyclinic*, in which she records the ash content and the percentage of P_2O_5 in twenty different condiments. As a result of her work in Professor Trimble's laboratory in 1884, she read her first scientific paper on "Preliminary Analysis of the Bark of Fouquieria Splendens," before the A. A. A. S., which met in Philadelphia in the month of September of that year. It is essentially a report of a so-called proximate analysis with selective solvents.

Sickness prevented her from continuing her studies until February, 1885, when she began the "Chemical Study of Yucca Angustifolia" in Professor Trimble's laboratory, the paper on this subject being read at the Ann Arbor meeting of the A. A. A. S. in August of that year. It is a much more extensive report, but along similar lines to the one of the previous year.

Having dropped her medical studies, she spent some time in 1885 and 1886 in the study of mathematics and the modern languages, looking toward admission to the junior class of the University of Pennsylvania, with the ultimate hope of attaining a Ph.D. degree.

However, her enthusiasm for plant chemistry did not abate; but with the exception of two papers, her contributions were rather of the character of essays or lectures than of reports of research. These two exceptions are the one "On Hæmatoxylin in the Bark of Saraca Indica," and "On the Occurrence of Solid Hydrocarbons in Plants," both of which are the result of work under the guidance of Professor Trimble in the Philadelphia College of Pharmacy.

Of her lectures she herself records the following in her diary: "That season I gave two lectures before the Franklin Institute, and I lectured at the Academy of Natural Sciences, and at the Philadelphia College of Pharmacy to large audiences. In the Spring of '87, I gave, at Washington, one of the Saturday lectures under the auspices of the Philosophical and Anthropological and Biological Societies, in the United States National Museum. The subject chosen was the chemistry of the higher and lower plants, and owing to the courtesy of Dr. Wiley, the government greenhouses were placed at my disposal, and a living exhibition of plants, from the highest to the lowest, illustrated my lecture. Most of the Washington science coterie were present, and after the lecture we met at an informal reception."

The subjects of her lectures are: (1) "Certain Chemical Constituents of Plants Considered in Relation to their Morphology;" (2) "Plant Analysis as an Applied Science;" (3) "Plant Chemistry, as Illustrated in the Production of Sugar from Sorghum;" (4) "The Chemical Basis of Plant Forms;" (5) "Comparative Chemistry of Higher and Lower Plants."

The summer of 1887 finds her again on the ocean, in search this time of a laboratory in which to pursue her phytochemical studies. "The magic of her name," says her biographer, "was an open sesame to all doors. Her researches made her known to the learned world of England and the Continent."

The notes taken down, as she went from place to place, and later copied into a book, are possibly the most interesting part of the volume,[1] since she was not content to see the laboratories and their

[1] Studies in Plant and Organic Chemistry, and Literary Papers.

equipment, but called at the professors' homes as well. Since it is but seldom that we are favored with a description of the laboratories and studies of the great men in chemistry as seen through a feminine eye, the following two paragraphs, descriptive of Hofmann's laboratory and study, may be quoted as an illustration of the kind of notes which Miss Abbott took down:

"The laboratory looked like a place, a home, which had not the personal supervision of a head. I see where my weak points are, and what is necessary for me to do to fortify myself by study. The beginners are made to work on some inorganic compound first for qualitative study; then they are hurried to organic chemistry. It is the worship of the benzole ring. The assistant told me that it was all he cared for. Tiemann, the one who has synthetically made vanillin, was absent.

"Hofmann's study in his house is quite a large room, containing family portraits. Over his desk is a marble female bust. The furniture is black and gold, sofas and chairs covered with green. The carpet looks like chinchilla, a velvet one. The chemical lecture-room of the university (Hofmann's) is where the Chemical Society usually meets. I was present on the opening night, October 10th."

After her visit to the scientific centers of England, Norway, Sweden, Denmark, Germany, Switzerland and France, she returns via England to the United States and begins studying under the direction of Professor Arthur Michael, of Tufts College. She was married to him in June, 1888, and in the summer of the same year Professor and Mrs. Michael started on a trip around the world, which lasted about a year and a half.

On their return to America, Professor Michael accepted the position of Director of the Chemical Laboratory of the newly established Clark University at Worcester. He resigned shortly afterwards, and the following year (1891) he and Mrs. Michael took up their residence at Bonchurch, Isle of Wight, England, where they equipped a private laboratory and continued their research work. After a residence of four years, they returned to Boston, Professor Michael resuming his connection with Tufts College.

During this period there appeared, in 1892, "Ueber eine neue Bildungsweise von aromatischen Nitrilen" and "Zur Kenntniss der Mandelsäure und ihres Nitrils," joint reports with John Jeanprêtre in the *Berichte;* "Zur Kenntniss der Addition von Brom und Chlor

zu fester Crotonsäure," which appeared in Volume 46, page 273, of the *J. f. pr. Ch.*, and 1894, "Zur Constitution des Phloretins," again in the *Berichte* of the German Chemical Society, of which she was a member. The change in subjects from those of the years 1886–87 speaks for itself.

Having returned to America, as mentioned above, she delivered her last public address on a scientific subject in her home city before the Franklin Institute, March 8, 1895, namely: "A Review of Recent Synthetic Work in the Class of Carbohydrates."

In 1896 she went abroad again. Although she had "resumed her chemical researches at the Tufts College Laboratory, . . . her interests were becoming enlisted in wider fields." Instead of writing about chemical professors, their laboratories and their studies, she now writes about the Austrian peasant and kindred topics.

Yet in the Fall of 1900 she enters the Medical School of Tufts College and wins her doctor's degree in June, 1903.

Associated with another woman physician, she spent most of her spare time caring for poor patients, who flocked to her private house, transformed into a free hospital. Stricken by the grippe, and after a trying illness, she passed away in Boston on the 29th of November, 1904.

As a fitting close to this rather objective review, the words spoken at her funeral by a friend of her family may herewith be quoted: "We cannot help recalling the universality of her personality and its many-formed expression, of her wide sympathies and appreciations. We must realize that as, after all, humanity is the essence of religion, she was deeply religious. We must mention the many polished facets of her jewel-like mind, and how she won distinction in music, languages, expression, both prose and poetic, in scientific research, and finally, even in the few months of her active practice, in medicine. We are certain that medicine, being both subjective and objective, and bringing her into ever closer touch with humanity and its needs, spiritual and physical, was her final and most fitting expression."

BOOK REVIEWS.

THE BRITISH PHARMACEUTICAL CODEX.—An Imperial Dispensatory for the Use of Medical Practitioners and Pharmacists. By Authority of the Council of the Pharmaceutical Society of Great Britain. Published by the Pharmaceutical Society at 72 Great Russell Street, London, W. C., 1907. Price, 12*s.* 6*d.* net (abroad, 13*s.* 6*d.*), delivered.

This ponderous tome of more than 1400 pages comes as an opportune and highly interesting contribution to the almost worldwide efforts that are being made to rehabilitate the profession of pharmacy in a field from which its votaries have been all but driven out by the manufacturers of nostrums and proprietary remedies.

In England itself this book appears to have been received with marked evidences of approval on the one hand, and vigorous, and, one might almost add, venomous, criticism on the other. The marked differences of opinion that have characterized the reception of this book may be taken as evidence that it has aroused a healthy interest in things pharmaceutical at home, and for this reason, if for no other, it is well worth the attention and study of pharmacists in all parts of the world.

In a preliminary review of this kind it will, of course, be practically impossible to call attention to all of the various features of the Codex that merit recognition, and we must content ourselves with a more general inquiry into the object, the contents and the uses of the volume before us.

From what has already been said, it will appear that the British Pharmaceutical Codex is in reality more than a mere recipe book, and that it actually essays to be, as its subtitle indicates, "An Imperial Dispensatory for the Use of Medical Practitioners and Pharmacists." That this claim of the publishers is well founded is evidenced by the fact that the book contains upwards of 2,500 monographs and formulæ in addition to a number of tables that add materially to its usefulness as a pharmaceutical handbook and guide.

The practical value of the volume is further augmented by an exhaustive index, contained in 104 double-column pages, that represents upwards of 12,000 references.

In the preface the existence of the Codex is explained as being the result of an apparent need for a reliable work of reference, on the available or recognized materia medica, published by the

authority of some statutory body, and the book is the direct outcome of a resolution adopted by the Council of the Pharmaceutical Society on November 4, 1903.

The production of the Codex was entrusted to a committee consisting of Messrs. Michael Carteighe, C. B. Allen, S. R. Atkins, J. F. Harrington, G. T. W. Newsholme, R. A. Robinson, and J. Rymer Young. This committee subsequently deputed the labor of compiling the information to a sub-committee consisting of Dr. W. E. Dixon, Prof. H. G. Greenish, and Messrs. Edmund White, W. F. Gulliver, F. W. Gambel, and John Humphrey, the latter acting as secretary.

That this committee has devoted much arduous labor to the solution of the problems that presented themselves will be admitted by all who are sufficiently interested in pharmacy to become more fully acquainted with the book itself. To the credit of the Pharmaceutical Society it should be said that much of the work was done in the research laboratory of that Society, though much of it was voluntarily undertaken by individual members of the Society and others interested in the development of the book.

The direct object of the Codex is to give English pharmacists and physicians information regarding all medicines and medicinal preparations that are at all popular throughout the wide extent of the British Empire. In addition to embodying the whole of the British Pharmacopœia the book also includes much information concerning articles that are official in France, Germany and the United States, and it also contains many formulas for preparations having a more or less local repute.

The monographs and formulæ are arranged alphabetically and the style of the descriptive material is similar to that followed in modern pharmacopœias.

The descriptions of crude drugs, for instance, include references to name, species, source, collection, production and preparation of the drug followed by a clear, though somewhat popular, description that not infrequently includes anatomical and chemical information. The microscopic structure of important drugs is usually described at some length, and in many cases attention is specifically directed to the kinds of cells and cell contents that are not found in the drug, and are, therefore, indicative of adulteration or sophistication.

The monographs of chemical substances are also quite compre-

hensive, and, for the physician particularly, quite practical, as they contain numerous and varied suggestions for prescribing and dispensing the several articles.

One rather interesting feature, and one that has resulted in considerable controversy and criticism, is the attempt that has been made to give brief but descriptive titles to substances of definite composition which are exploited under a variety of trade names. In addition to giving the true chemical name, as a synonym, reference is usually made to the trade-protected titles in foot-notes to the respective monographs. Thus, under Formamina or Formamine we have, as synonyms, Hexamethylenamina and Hexamethylenetetramine, and, in a foot-note, the statement: "Formamine is also known under the following trade names: Aminoform, Ammonio-formaldehyde, Ammonaldehyde, Cystamine, Cystogen, Formin, Metramine, Urisol, Uritone, Urotropine and Vesalvine.

While this is one of the more familiar examples of the unnecessary duplication of names for the same article, we must remember that, owing to the more conservative nature of the British patent laws, pharmacists in Great Britain are much more harrassed by the multiplicity of trade names for well-known articles than we, in the United States.

Whether or not the Codex Committee will be successful in establishing and maintaining the position that they have taken in this connection remains to be seen. The innovation certainly offers a means for fighting quackery and allied practices by supplying accurate information respecting drugs and medicines in common use, and, by removing the veil of secrecy, demonstrating that fancy names are all too frequently the means of extorting exorbitant prices for comparatively simple substances.

Formulæ for galenical preparations are unusually numerous and comprise fully two-thirds of the total number of articles included in the book. With few exceptions, the preparations are directed to be made to parts by weight or volume, leaving the choice of the system of weights and measures used to the pharmacist, though the Committee distinctly recommends the use of metric weights and measures as being more in keeping with the object of the book and the scientific needs of the profession.

The number and the nature of the formulæ contained in the book also serve to illustrate the characteristic differences that exist between American and British pharmacy.

The class titles of many of the preparations sound quite strange to an American pharmacist; as they not infrequently indicate the therapeutic uses, or the method of administering the several preparations. We find it rather unusual to see formulæ for baths, enemas, lotions, spray solutions, injections and snuffs in a book that partakes of the nature of a pharmacopœia, and comparatively few American pharmacists would be able to give an adequate description of the general composition, nature, or the uses of a "Linctus." Another characteristically British feature is to be seen in the comparatively large number of formulæ for such preparations as confections, decoctions, and infusions. Still another illustration of British conservatism is to be found in the monograph on capsules, which embodies detailed and really valuable directions for making the well-known elastic capsules and incidentally asserts that: "A capsule of American origin, sometimes used, is cylindrical or cup-shaped, and closed by a lid of the same material, which fits tightly over the end of the capsule; it is not suitable for liquids."

The very varied uses to which these empty capsules are adapted, in the hands of the American pharmacist, evidence the fact that our English cousins are not as yet familiar with the possibilities of this particular form of dose administration.

Apart, however, from a comparatively few distinctive features that serve to reflect some of the more characteristic features of British pharmacy, the British Pharmaceutical Codex contains much valuable information and an innumerable number of practical suggestions that should be of great use to the pharmacist in this country, particularly at this time.

One of the more evidently commendable features, in this connection, is to be found in the pharmacological notes that include just the sort of information that is useful to the pharmacist. This information is doubly useful in that it acts as a deterrent feature to the all-too-widespread habit of counter prescribing, and at the same time enables the pharmacist to make intelligent suggestions to the physician who is in search of a substance that will take the place of one not fully suited to the particular case that he happens to have in mind.

The pharmacology of the book has been contributed by Dr. W. E. Dixon, Professor of Pharmacology, Kings College, London, a widely recognized authority on the subject, whose name alone will

serve as a guarantee of the up-to-date character and the general reliability of the information that is presented under this heading.

An innovation that should contribute materially to the popularization of the Metric System with English-speaking people is the introduction of the term "mil" to represent the one-thousandth part of a liter, in place of the more cumbersome and less practical cubic centimeter.

In this connection it may be pointed out that despite the fact that the word "mil," a contraction for milliliter, has been officially recognized as being permissible, no serious attempt has ever been made to introduce it in this country, and the renewed prominence that is given it in the Codex may serve to popularize it in American medical and pharmaceutical literature.

One might go on at great length, pointing out the interesting features that are to be found in this particular book, but enough has been said to indicate that the Pharmaceutical Society of Great Britain has once more demonstrated its right to continue as an educator not alone of students of pharmacy and of members of the Society, but also of pharmacists and physicians generally.

That a book that portends to be so exhaustive, so original and so far-reaching as this, would of necessity contain many errors of a minor nature that were overlooked in the final reading of proof, is to be expected, and the Committee in charge of the publication are to be congratulated that these mistakes are not more serious and more numerous than the carping critics in England have been able to find. As it is, they are practically all enumerated in a table of errata in the front part of the book.

The British Pharmaceutical Codex will certainly serve to strengthen the position of the Pharmaceutical Society of Great Britain, and will further serve to define the relations that should exist between the pharmacist and the physician on the one hand, and the pharmacist and the public on the other.

The book should be of peculiar interest to the physician, in that it contains more than the usual amount of information directly of interest to medical practitioners, and for the pharmacist it will serve to answer many thousands of questions that arise constantly in the laboratory and at the prescription counter.

M. I. WILBERT.

THE PHILADELPHIA BRANCH OF THE AMERICAN PHARMACEUTICAL ASSOCIATION.

FEBRUARY MEETING.

The stated meeting of the Philadelphia Branch of the American Pharmaceutical Association, held on February 4, 1908, was devoted to a discussion of "The Responsibilities of the Retail Druggist in the Spread of the Great Black Plague."

The subject proper was introduced by Dr. Henry Beates, Jr., who discussed "The Relation of Medical Practice Acts to Contagious and Infectious Diseases." He called particular attention to the fact that in populous communities the so-called fundamental privileges or rights of the individual must of necessity be subordinated to the welfare of the community as a whole.

He further called attention to the generally accepted definitions for what is understood by "practice of medicine," and pointed out that the usually accepted right of "self-medication" is not permissible for persons suffering from a contagious or infectious disease, particularly when the health and even the lives of others may be in jeopardy.

Dr. A. A. Uhle, Assistant Instructor in Genito-Urinary Diseases at the University of Pennsylvania, presented a rather exhaustive paper on "Gonorrhea, its Nature, Prevalency, Recognition and Treatment," in the course of which he quoted a number of rather interesting statistics as to the prevalency of this disease, and the time and money loss that it involves. He also called attention to the ease with which this disease may be spread and the difficulties that beset the proper diagnosis and the successful treatment of it, even in the hands of physicians who devote all of their time to its study.

Dr. E. E. Montgomery, in opening the general discussion, confined his remarks to the consideration of "the infection of the innocent and the suffering and misery that is entailed." In his introductory remarks he expressed the opinion that, if gonorrhea could be limited to the vile and the vicious, it might be considered as being a beneficent agent, but, unfortunately this disease is most prone to attack the innocent, and here, being ofttimes unrecognized, because unsuspected, it usually causes great damage before it is brought under control.

Dr. Montgomery briefly outlined a number of ways in which innocent and unsuspecting persons might be inoculated with this really

dread disease, and graphically portrayed the sufferings, more horrible than death, that are in store for a trusting woman who is unfortunate enough to be wedded to a man with a latent or chronic gonorrhea, the result, all too frequently, of the improper treatment accorded him at the hands of the retail druggist.

In concluding his remarks he asked whether, with such an array of conditions that are possible as the sequelæ of an improperly treated case of gonorrhea, any number of men would be willing to stultify themselves by risking the happiness, health and even the lives of innocent persons for the meager profit that might accrue from the illegal prescribing for diseases of this type.

Dr. George E. de Schweinitz, in speaking of "Gonorrheal Ophthalmia and its Relation to Total and Partial Blindness," said that the pharmacist no less than the physician must on occasion assume the rôle of instructor, to prevent the unnecessary spread of disease, and to do this he must himself possess or seek the necessary information.

The doctor then briefly reviewed the various types of purulent infections of the eye and called particular attention to the really serious nature of this condition.

He particularly warned retail druggists to refrain from selling eye lotions for sore eyes in the newborn, as this condition is almost invariably due to a gonorrheal infection of the mother, and, unless properly treated, is sure to result in total blindness.

In conclusion, he begged his hearers to bear the ever-present possibility of gonorrheal infection of the eye and the resulting blindness in mind, and not to contribute, either directly or indirectly, to the increase of this really horrible affliction.

Dr. Thomas Neilson spoke of "The More Remote Complications of Gonorrhea in the Male," and referred particularly to the difficulty of effecting a cure in a patient who had been improperly treated and was suffering from latent or chronic gonorrhea.

He emphasized the fact that a patient thus afflicted was particularly dangerous in that he was a prolific source of infection to others, without himself being aware of the damage he was doing.

Dr. Neilson also referred at some length to the possible complications that may result from autoreinfection, and in conclusion assured those present that gonorrhea is indeed one of the most serious infections to which mankind is liable, and, while it is true that the gonococcus itself is not so deadly, the frequency of mixed

infection, the possible complications, and the lowered vitality are all factors that make for continued suffering, and not infrequently an untimely death.

The subject was further discussed by a number of the members and visitors who were present, and it was unanimously agreed that it would be well to endeavor to have the information presented at this meeting reach even a larger audience. On motion, Mr. A. J. Staudt, Dr. Henry Beates, Jr., and Prof. Henry Kraemer were appointed a committee to secure copies of the several communications, and, if practicable, have them reprinted in pamphlet form for general distribution among retail druggists.

At the business session a communication from Dr. John V. Shoemaker, the president of the American Therapeutic Society, was presented, and it was agreed to hold a joint meeting with that society on the evening of Thursday, May 7th, and also to exhibit a line of U.S.P. and N.F. preparations at the meetings of the American Therapeutic Society.

A motion to endorse Mr. William L. Cliffe as a candidate to succeed himself as member of the State Pharmaceutical Examining Board was accepted by a rising vote.

Prof. Henry Kraemer, Dr. H. C. Wood, Jr., and Mr. R. H. Lackey were appointed a committee to submit nominations for officers for the coming year.

MARCH MEETING.

The meeting of the Philadelphia Branch of the American Pharmaceutical Association, on the evening of Tuesday, March 3, 1908, was devoted to a discussion of the several problems that are involved in the manufacture and sale of flavoring extracts.

An invitation had been extended to members of the American Extract Manufacturers' Association to be present and take part in the discussion, and this association was represented by members from Philadelphia, New York, Brooklyn, Jersey City, Baltimore and other places. There were present also a number of manufacturers of flavoring extracts not members of the American Extract Manufacturers' Association, and also a number of chemists more or less directly affiliated with the extract trade.

The first communication on the programme was a paper by Mr. A. E. Claus on "Formulæ for Flavoring Extracts," being the

views, from a practical standpoint, of the American Extract Manufacturers' Association.

Mr. Claus called attention to the conflicting rulings that have been made by the Department of Internal Revenue and the Bureau of Chemistry, and pointed out that a manufacturer was held liable for tax or fine by the Internal Revenue Department for using an excessive amount of alcohol in his preparations, or for adulteration by the Bureau of Chemistry if the amount of alcohol used did not come up to the established ideas or standards.

Referring more specifically to extract of vanilla, he asserted that the Mexican varieties were not uniformly superior to other beans, and that manufacturers of the better grades of flavoring extracts usually preferred the Bourbon varieties of vanilla as being more uniformly satisfactory.

He further called attention to the fact that manufacturers of flavoring extracts had found it to be impracticable to handle all varieties or lots of vanilla in the same manner or to extract them with the same menstruum. He believed that, other things being equal, the less alcohol a flavoring extract contained, the more satisfactory it would be for the purpose for which it was intended; and for this one reason alone, if for no other, the U.S.P. formula for extract of vanilla was to be condemned.

For extract of lemon he believed that the U.S.P. requirements were entirely too high, both as to alcohol as well as oil content. He asserted that a weaker preparation would prove to be much more satisfactory as a flavor.

In speaking of the use of terpeneless oils, he expressed the belief that the use of terpeneless extracts was sure to grow in favor, though the so-called terpeneless oils of lemon and orange now on the market do not appeal to the well-informed extract manufacturer, who generally prefers to make his own terpeneless oils.

Mr. Claus pointed out that the so-called minor extracts are of little or no importance, as the bulk of the extract business is with vanilla, lemon and orange. In discussing standards, he suggested that the official standards should be minimum standards based on the flavoring units contained in the finished preparation. As a satisfactory formula for vanilla he suggested 10 ounces of vanilla to a gallon of extract, representing from 30 to 40 per cent. of alcohol.

The next speaker, Prof. I. V. S. Stanislaus, presented a communi-

cation entitled, "The U.S.P. as a Standard for Flavoring Extracts." As an introductory to his remarks, he said that in discussing this subject from the point of view of the pharmacist, much of what he had to say would, of necessity, be diametrically opposed to what the previous speaker had said, as he fully believed that the standards of the U.S.P. were not impracticable or unattainable.

Professor Stanislaus believes that the retail pharmacist is fully competent to supply all possible demands for flavoring extracts and that he should be in position to look for and to command the trade in at least the better quality of flavoring extracts.

That the retail druggist is even now supplying the superior article was evidenced by a number of quotations from the reports of analysts and other authorities quoted by Professor Stanislaus in support of his contention.

Prof. Charles H. LaWall presented a communication on "Some Flavoring Extracts I Have Seen," and exhibited a number of specimens that had come under his observation.

He said that while it is true that vanilla, lemon and orange do constitute the more important class of flavoring extracts, the mixtures of fruit ethers, so common years ago, are still used and have quite a ready sale in connection with the cheaper grades of soda syrups.

He also called attention to the fact that the proper labeling of a substance did not always detract from its ready sale, and related how at least one curbstone soda-water vender developed a thriving business by the prominent display of a sign asserting that "Our syrups are guaranteed to be artificial."

Mr. C. S. Brinton called attention to "Food Inspection Decisions, No. 47," and also referred at some length to a number of points bearing on the subject of flavoring extracts, particularly the definitions for vanilla extract, lemon extract and orange extract contained in Circular No. 19.

Dr. T. C. Stearns, in opening the general discussion, expressed the appreciation of the members of the American Extract Manufacturers' Association for this opportunity to discuss what is to them a vitally interesting subject. He asserted that the American Extract Manufacturers' Association is on record as being in favor of standards for flavoring extracts, but he also pointed out that it would be difficult indeed to establish reliable and generally equitable standards for such products as vanilla, for instance.

He emphasized the fact that each particular lot of vanilla must be treated with a specially selected menstruum designed to extract the virtues of that particular variety of bean.

Dr. Stearns also called attention to the fact that extract manufacturers were being unnecessarily harassed by the Bureau of Chemistry on the one hand, and the Internal Revenue Department on the other, and that the decisions of these two departments of the Federal Government did not always coincide.

Mr. Collins, taking up some of the thoughts suggested by Dr. Stearns, expressed the belief that a lower percentage of alcohol in flavoring extracts would generally be preferable, particularly in extract of vanilla. His experiments with this preparation led him to believe that an extract containing not more than 25 per cent. of alcohol would be preferable, in every respect, to a preparation containing a higher percentage of alcohol.

He also called attention to the fact that the term extractive is but a relative one, and that it is quite impossible to determine what is meant by "extractive from 10 grammes of vanilla."

Professor Remington expressed his appreciation of the information that had been offered, and said that he was in favor of having two standards for products of this kind, one for drugs and druggists and another for substances to be used as food products.

Professor Kimberly related some personal experiences that he had had as chemist to the food commissioner of North Dakota.

Referring to the one-time widespread use of wood alcohol, he said that, in 1902, out of ten samples of lemon extract that were examined, no less than five contained methyl alcohol.

Lemon was perhaps the most frequently sophisticated of all of the flavoring extracts, and in North Dakota, in 1902, only two of the specimens that were examined were found to be true to label.

Professor Kimberly believes that the establishing of standards for flavoring extracts is possible, and that the acceptance of comparatively high standards by the manufacturers of such products would be of great advantage in bringing about a desirable reform in this trade.

Dr. Horn asserted that it was his belief that the manufacturers of extracts are ready and willing to supply the demands of the people, and that the government authorities should content themselves with insisting that the people get what they really want. He

believes that the drug store is not the place to make and sell flavoring extracts, particularly as the men who conduct drug stores are very much like other men. So far as standards are concerned, Dr. Horn believes that, for vanilla, people desire the flavor of vanillin, but, not knowing the facts in the case, many people would no doubt object to buying it in any form but that usually known as extract of vanilla.

Dr. McCormick related an experience that led him to believe that a vanillin mixture would be uniformly more satisfactory than a corresponding extract made from vanilla beans. He also expressed the belief that all of the more reputable manufacturers of extracts would gladly welcome the establishment of standards, if equitable standards were practicable.

Mr. Brinton suggested that extract manufacturers should themselves be in position to suggest reliable standards in that they should have at hand considerable reliable data bearing on the several properties of the various varieties of vanilla beans and the extractive that is contained in them. If this data is not available, it would offer an excellent opportunity for research work on the part of some one manufacturer.

Mr. Brooks related his experience as State chemist in New Jersey. He pointed out that agents invariably look for articles that are likely to be wrong, so that the number of spurious or adulterated articles reported should not be taken as a criterion of the average condition of affairs. He has met with vanilla, lemon, ginger and even paregoric made with wood alcohol. He pointed out that flavoring extracts, as sold at the present time in the city of New York, were far from being above reproof.

In a recent examination that he made for *Good Housekeeping*, he found that but seven out of twenty-nine samples of extract of lemon were true to label; sixteen of the twenty-two below standard were absolutely false, and two of them contained wood alcohol; four of the seven pure brands contained 8 per cent. or more of oil of lemon, showing that a standard higher than that of the U.S.P. could be maintained.

Eight of sixteen samples of vanilla extract were found to be pure. Of the remaining eight, two contained coumarin, six contained excessive amounts of vanillin, and two contained wood alcohol.

Mr. Clawson admitted that there was much to be said on both sides, but he also believes that the manufacturers of flavoring extracts have made wonderful strides in improving their goods.

The subject was further discussed by a number of the members and visitors present, and at the conclusion of the discussion a vote of thanks was extended to the members of the American Extract Manufacturers' Association for their interest in taking part in the discussion.

At the business session, which preceded the regular meeting, announcement was made of a joint meeting to be held under the auspices of the Philadelphia County Medical Society, at which communications were to be presented by members of the local branch.

A committee was appointed to arrange for the details of the joint meeting to be held with the American Therapeutic Society, in May. The program, as proposed for this meeting, is quite an elaborate one, and will include a joint scientific meeting and an exhibition of official preparations.

The report of the Committee on Nominations was unanimously adopted, and on motion the following were declared duly elected as officers for the coming year: President, William McIntyre, of Philadelphia; first vice-president, William L. Cliffe; second vice-president, Charles H. LaWall; and secretary-treasurer, M. I. Wilbert.

M. I. WILBERT,
Secretary.

PHARMACEUTICAL MEETING.

The stated pharmaceutical meeting of the Philadelphia College of Pharmacy was held Tuesday, March 17, 1908, at 3 o'clock, Henry C. Blair presiding.

The meeting was principally devoted to a discussion of the formulæ given in the National Formulary and kindred topics. The discussion was opened by Prof. E. Fullerton Cook, Assistant Director of the Operative Pharmacy Laboratory, who exhibited one hundred or more N. F. preparations, comprising the fluidextracts and a majority of the elixirs, stating that he had been assisted in the work by the following students: T. C. Ladakis, Ralph R. Johnston, Lee F. Mauger, Edgar R. Buzzell, D. H. Reighter and Frank S. T.

Bonnell. No adverse criticisms were offered on the formulæ of the fluidextracts, but attention was called to the fact that in purchasing the drugs for the preparation of the fluidextracts, it was found that crude drug dealers for the most part use synonyms as chief titles on their labels, the botanical names being given in parentheses; and as these synonyms frequently apply to more than one drug or plant, and hence are not distinctive, the revision of the labels used by crude drug dealers was suggested. The observations on elixirs were presented in the form of a paper, which will be published in a later issue of this JOURNAL. Professor Cook also called attention to samples of the N. F. milk of magnesia, and stated that in order to avoid coloration of the preparation, it should be made with distilled water, at the same time recommending an increase of the amount of water directed by the formula, as the preparation is not sufficiently liquid.

Among those taking part in the general discussion were: Prof. C. B. Lowe, M. I. Wilbert, Prof. Joseph P. Remington, William L. Cliffe, George M. Beringer, Franklin M. Apple, and the chairman.

The question having arisen as to the existence of curaçao oil of orange, Professor Remington said that as the National Formulary is an expansion of the New York and Brooklyn Formulary, and the latter being largely the work of Dr. Rice, it therefore appeared that the oil was a genuine article at that time.

Mr. Blair criticised the elixir of curaçao on the ground of its being acid in character, claiming that elixirs should be neutral preparations. He also suggested an improvement for the elixir of terpin hydrate, whereby the terpin hydrate is dissolved in a solution consisting of equal parts of alcohol and glycerin.

Mr. Apple said that by reason of the high percentage of glycerin in glycerinated elixir of gentian, it rightly belongs to the class of glycerites, and that owing to the presence of several ingredients, the word "compound" should be added to the title.

Mr. Wilbert commented unfavorably on fluidextracts as a class of pharmaceutical preparations, and said that of those, formulæ for which are given in the National Formulary, only about twelve or fifteen are efficient or should be used. He likewise condemned the N. F. elixirs, saying that the majority of them are now obsolete, and that they were obsolete when the formulæ were first published, but were introduced into the New York and Brooklyn Formulary to satisfy the craze for elixirs at that time. He said that the original formu-

lary included fifty-two elixirs, and that of the eighty-eight formulæ now incorporated in the National Formulary, possibly a dozen have some slight merit.

Professor Remington said that the main object had in mind in making this display of N. F. elixirs was to elicit detailed criticism of the formulæ. He claimed that the formulæ had the advantage of not being secret, and said that the preparations were in his opinion much better as a class than the nostrums which are being or have been prescribed.

Mr. Cliffe said that the elixir of the glycerophosphates furnished an exception to this rule, the preparation on the market being the better.

Mr. Beringer said that by looking over recent legislative acts it will be found that in various States the formulæ of the U. S. Pharmacopœia and National Formulary are made absolute. He cited the New Jersey law as an example, and said that when either an U.S. P. or N. F. preparation is ordered, the pharmacist must not vary the formula in any particular, even when he knows it to be faulty. He, therefore, claimed that the law is radically wrong; and said that formerly when an improvement was found, the pharmacist was free to state it. He said that he desired it to be understood that he was not opposed to the National Formulary, particularly as it was originally planned by the American Pharmaceutical Association. One of the criticisms which he offered related to the formulæ adapted from other authorities. He said that if the physician desires a preparation of the British Pharmacopœia, the German Pharmacopœia or the French Codex, he does not get this if he orders the corresponding N. F. preparation, as the formula has been modified so as to give an entirely different preparation. He also questioned the practice of publishing formulæ to simulate those of proprietary preparations, claiming that the originators of these formulæ have in many instances a rightful claim to them, and of these preparations he mentioned Dieterich's solution of iron. He strongly favored an early revision of the National Formulary.

Mr. Wilbert maintained that the reason the National Formulary is faulty is not that the American Pharmaceutical Association is unwilling to make improvements, or that the Committee are not willing to make improvements, but that the fault lies with American pharmacists. He alluded to the Apotheker Verein, which main-

tains the Pharmaceutical Institute at Berlin, where laboratory facilities are furnished for carrying on work of this kind, and said that some such plan should be adopted in this country. He said it was unreasonable to expect three or four men to work out formulæ for the 40,000 pharmacists of the country.

Professor Remington remarked that the question here was the same as with the Pharmacopœia; that for seventy years things went along very quietly; but when the Food and Drugs Act was passed, a different attitude was assumed, and comments began to be freely made and information volunteered.

At the conclusion of the discussion, Mr. Beringer offered the following resolution, which was adopted:

Resolved, That we request that the Committee on National Formulary, of the American Pharmaceutical Association, proceed *immediately* to revise that work, so as to make it a proper legal standard; and, further, that the members of the Philadelphia College of Pharmacy and the pharmacists attending this meeting, pledge their assistance to the committee toward improving the work and making the formulas satisfactory.

A paper entitled, "Suggestions from the British Pharmaceutical Codex" was read by M. I. Wilbert (see page 172). While reading the paper, he incidentally remarked that if the quantities of sodium borate and sodium benzoate, directed by the formula of the N. F. for alkaline antiseptic solution be reversed, the preparation is much improved.

Prof. Charles H. LaWall read a paper on "The Quantitative Estimation of Benzoic Acid in Catsup" (see page 171).

Prof. Henry Kraemer announced that fifty-four volumes of the AMERICAN JOURNAL OF PHARMACY and forty-seven volumes of the "Proceedings of the American Pharmaceutical Association," had been donated to the college by one of its members, Dr. Joseph Heintzelman, and moved that a vote of thanks be tendered Dr. Heintzelman for his liberal gift, which motion was unanimously adopted.

FLORENCE YAPLE,
Secretary pro tem.

ESPERANTO, UNIVERSAL OR FRENCH?[1]

Now that turbines, electric power and flying machines are destroying distance, the nations of the world are concerning themselves as to the best means of drawing mind together as well as matter. A universal language is being universally talked about, but the real question is, What shall we talk? The vast extent of the British Empire, and the enormous population of the United States, have created a feeling that English must be the dominant language of the future; but a Russian, M. J. Novicow, in the *Revue des Deux Mondes*, puts in a plea for French as a universal language, and makes a very good argument for it. Curiously enough, the French seem to be rather indifferent, and lean more towards an artificial language, preferably "Esperanto," the one that contains fewest of the elements of Latin, whilst "Universal," founded by a German, Dr. Molenaar, entirely on French, has met with no success. After disposing, in a lively and convincing manner, of the myth of Teutonic and Anglo-Saxon superiority, M. Novicow shows the absurdity of allowing national *amour-propre* to prevent the adoption of a living language as a universal means of communication. The Germans and English are the only objectors to the use of French as such a language; yet *amour-propre* does not prevent their considering it very advantageous to speak French, and making great efforts to succeed in doing so.

Also, there is individual as well as national feeling to be reckoned with; and M. Novicow sees no reason for adopting the language of a Warsaw doctor, when there are other made-to-order tongues that he considers superior; moreover, Dr. Zamenhof and the Esperantists profess quite as much scorn for Universal as he and others do for Esperanto. So much for *amour-propre*.

The plea of facility is disposed of with equal readiness. A Russian, knowing no language but his own, will find it no easier to call *vada* (water) *sidi*, in artificial tongue, than *water* in English or *acqua* in Italian. The mixed systems are even more difficult than living languages, except to those who already know all that they are derived from. Thus, to find Esperanto easy, one must know French, English, German, Russian, Latin and Greek! To know an auxiliary

[1] In view of the present advocacy of "Esperanto" for international correspondence, it was thought that the above would be of interest to our readers.—EDITOR.

language, a man must first learn six others! This is hardly following the line of least resistance. For *queue*, Esperanto uses the word *vost*. This is as easy for those who know its Russian analogue, *koost*, as it is for a German to understand *trink*, and for a Greek, whose *and* is *kai*, to find *kaj* simple. But what would these words signify to a Frenchman, who would have to learn them just as he would the Arabic words *bent* (woman) and *efta* (key)?

As for the languages that derive from one source, a Frenchman would readily comprehend the sentence in Universal, "Lingi pure artifizial es totale inkomprensibil a prim vist," which in French is, "La langue purement artificielle est complètement incompréhensible à première vue;" but what would it convey to a German accustomed to "Eine ganz künstliche sprache ist vollkommen unverstaendlich zum ersten Blicke," or to a Russian used to, "Vpolnié iskonstvennyi yasyk soverchenno ne poniaten na pervye vxgliad?" "As for me," says M. Novicow, "although I know the six sources from which Esperanto is drawn, I have difficulty sometimes in understanding some of its sentences. Judge what it must be for one who understands only Italian or Swedish." There seems very little reason for learning a new and difficult language, without tradition or literature—for, as M. Novicow says, "Esperanto will never have its Cicero or Bossuet"—when there is ready to hand (or to tongue) a language like French, that has been used all over the continent as a court language, and to-day, as every traveler in Europe knows, will carry one almost anywhere.

He cites Italy as a land where a universal language coexists with many dialects. French might be the universal language, and all the other nations could keep their dialects for home use. Certainly the prospect is more attractive than that of having the burden of another language added to our over-burdened minds, especially when our minds would really receive no reward for the labor of learning, as only our tongues could wag in Esperanto. We should still want to know French for the sake of its literature, and it seems hardly worth while, in these labor-saving days, to try to build the Tower of Babel any higher.—*Putnam's Monthly and the Reader, April, 1908.*